

WHAT IS CLAIMED IS:

1. A hydrogen gas separator, comprising:

 a first porous layer made from a hydrogen permeable material; and

 a solid layer of said hydrogen permeable material disposed on said first porous layer and in contact with said first porous layer.

2. The separator according to Claim 1, further including a porous base layer for supporting said first porous layer.

3. The separator according to Claim 1, wherein said hydrogen permeable material of said first porous layer and said hydrogen permeable material of said solid base layer are the same material.

4. The separator according to Claim 2, wherein said porous base layer is not comprised of hydrogen permeable material.

5. The separator according to Claim 1, wherein said first porous layer has a pore size that varies as a

function of distance from said solid layer.

6. The separator according to Claim 4, further including at least one bonding layer disposed between said porous base layer and said first porous layer.

7. The separator according to Claim 1, further including a second porous layer made of said hydrogen permeable material, wherein said solid layer of said hydrogen permeable material is interposed between said first porous layer and said second porous layer.

8. The separator according to Claim 2, wherein said porous base layer is a sintered powder having a predetermined average particle size.

9. The separator according to Claim 8, wherein said first porous layer is comprised of multiple thick film layers, wherein each of said thick film layers has a different average particle size of said hydrogen permeable material.

10. The separator according to Claim 1, wherein said solid layer of said hydrogen permeable material is a

deposition layer that is deposited onto said first porous layer.

11. The separator according to Claim 2, wherein said porous base layer is shaped as a tube that defines a central conduit, wherein said first porous layer surrounds said base layer, and said solid layer surrounds said first porous layer.

12. A method of purifying hydrogen gas, comprising the steps of:

providing a hydrogen permeable structure having a porous layer of hydrogen permeable material covered by a solid layer of hydrogen permeable material;

exposing said hydrogen permeable structure to a gas containing hydrogen gas; and

causing a pressure differential across the hydrogen permeable structure, wherein said hydrogen gas permeates through said hydrogen permeable structure and is collected.

13. The method according to Claim 12, wherein said hydrogen permeable structure is tubular and said step of exposing said hydrogen permeable structure includes

passing gas through said hydrogen permeable structure under pressure.

14. The method according to Claim 12, further including the step of supporting said hydrogen permeable structure with a porous base layer of material.

15. The method according to Claim 12, wherein said hydrogen permeable material of said porous layer and said hydrogen permeable material of said solid layer are the same material.

16. A method of manufacturing a hydrogen gas separator, comprising the steps of:

forming a first porous layer from a hydrogen permeable material; and

depositing a solid layer of said hydrogen permeable material over said porous layer.

17. The method according to Claim 16, further including the step of forming contours in said solid layer.

18. The method according to Claim 16, further including the step of forming a second porous layer of said hydrogen permeable material, wherein said solid layer is interposed between said first porous layer and said second porous layer.

19. The method according to Claim 16, further including the step of forming a porous base layer of material and supporting said first porous layer with said porous base layer.

20. The method according to Claim 19 further including the step of bonding said first porous layer to said porous base later.